REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application. Claims 1-13 are now present in this application. No new matter has been added by way of the present amendment. For instance, newly added claims 5-8 are supported by the Specification at page 7, lines 33-37 and page 8, lines 1-7. Similarly, newly added claims 9 and 13 find support at page 10, lines 16-24. Support for newly added claims 10-12 can be found at page 8, lines 15-37. Accordingly, no new matter has been added.

In view of the following amendments and remarks, Applicants respectfully request that the Examiner withdraw all outstanding rejections and allow the currently pending claims.

Issues Under 35 U.S.C. § 102(b)

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Kamiya (JP 05-009035) (hereinafter Kamiya '035). This rejection is respectfully traversed.

The Examiner asserts that Kamiya '035 discloses a burner comprising a multi-tube assembly of three or more tubes and two tubular shells with nozzles disposed in the annular space of the tubular shells.

For purposes of illustration, not limitation, the Examiner's attention is directed to Applicants' Fig. 1. The novel burner of the instant invention comprises a multi-tube assembly 1 **consisting of** (emphasis added) three tubes: a center tube (2) for feeding a silica-forming compound, a first outer tube (3) for feeding oxygen gas and a second outer tube (4) for feeding hydrogen gas. The multi-tube assembly is surrounded by a first tubular shell (5), a plurality of first nozzles (6), a second tubular shell (7) and a plurality of second nozzles (8). Applicants have discovered that the novel

burner comprising a center tube with a **triple structure** (emphasis added) for feeding a silica-forming gas, hydrogen and oxygen produces synthetic quartz glass ingots with reduced transmittance variations between the periphery and the center of the ingot.

On the other hand, the burner of Kayima '035 comprises a center tube (refer to Drawing 1 of Nayima '035), a second tube for feeding hydrogen gas, a third tube for feeding argon gas, a fourth tube for feeding oxygen gas and a fifth tube for feeding argon gas. The supply of argon gas between the hydrogen and oxygen gas supplies in this burner would cool the flame and allow the flame to spread out, whereby the flame is not focused and the high-temperature region at the center would become uneven, thus resulting in variations between the periphery and the center of the ingot. In stark contrast, Applicants' novel burner ensures that the high-temperature region is extended through out the flame, resulting in an ingot with uniform characteristics from the center to the periphery.

Moreover, the first tube of the burner of the instant invention supplies a combustion-supporting gas, such as oxygen, while the second tube supplies a combustible gas, such as hydrogen. Contrary to Applicants' novel burner, the first tube of Kamiya '035 is designed for feeding hydrogen gas, whereas the third tube is the one designed for feeding oxygen gas.

Clearly, Kamiya '035 fails to teach or suggest all the limitations of independent claim 1 and thus fails to anticipate the same.

Because the invention, as set forth in Applicants' claims, is not disclosed by the cited prior art, reconsideration and withdrawal of this rejection are respectfully requested.

Issues Under 35 U.S.C. § 103(a)

Claims 2-3

Claims 2-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kamiya '035 in view of Komine et al. (U.S. 6,374,639) (hereinafter Komine '639). This rejection is respectfully traversed.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As discussed above, Kamiya '035 fails to explicitly or impliedly disclose a burner comprising a multi-tube assembly **consisting of** (emphasis added) three tubes: a center tube for feeding a silica-forming compound, a first outer tube for feeding oxygen gas and a second outer tube for feeding hydrogen gas, wherein the multi-tube assembly is surrounded by a first tubular shell, a plurality of first nozzles, a second tubular shell and a plurality of second nozzles. Furthermore, as acknowledged by the Examiner, Kamiya '035 fails to teach or suggest that the cross sectional area of gas discharge ports of the first nozzles disposed in the first tubular shell accounts for at least 5% of the cross-sectional area of the annular space between the multi-tube assembly and

the first tubular shell, or that the cross sectional area of gas discharge ports of the second nozzles disposed in the second tubular shell accounts for at least 5% of the cross-sectional area of the annular space between the first and second tubular shells. Komine '639 fails to cure these deficiencies.

The burner of Komine '639 comprises a center tube, a first outer tube, a second outer tube, a first tubular shell and first nozzles. Contrary to the burner of the instant invention, the burner of Komine '639 does not have a second tubular shell and second nozzles. Clearly, it would be impossible for this reference to teach that the cross sectional area of gas discharge ports of the second nozzles disposed in the second tubular shell accounts for at least 5% of the cross-sectional area of the annular space between the first and second tubular shells, because the reference lacks a second tubular shell and second nozzles.

In addition, if the second tubular shell and the second nozzles are not provided, the central portion and the peripheral portion of ingot growth surface are not formed in the same conditions upon the deposition and the vitrification steps, whereby the initial transmittance of the peripheral portion of the ingot would become lower than the initial transmittance of the central portion of the ingot. This phenomenon, as well as the burner disclosed by Komine '639, is shown in Comparative Example, and Figures 3 and 5 of the present invention. Thus, Komine '639 merely discloses the state of the prior art previously acknowledged by Applicants.

Furthermore, assuming *arguendo* that Komine '639 cured the deficiencies of Kamiya '035 (a point which Applicants do not concede), it is noted that references cannot be arbitrarily combined. There must be some reason why one of ordinary skill in the art would be motivated to make the proposed combination of the primary and secondary references. *In re Nomiya*, 184 USPQ

607 (CCPA 1975). Kamiya '035 is directed to a manufacture approach of the soot base material for optical fibers. On the other hand, Komine '639 is directed to the removal of chlorine from silica glass. One skilled in the art would not have been motivated to combine or modify these references, absent hindsight gleaned from Applicants' application. For this reason alone, the 35 U.S.C. § 103 rejection of Kamiya '035 in view of Komine '639 must be withdrawn. Further, even assuming that these references are combinable, each and every element of claims 2 and 3 is not shown or suggested by the combination, as previously disclosed.

Because the combinations, as set forth in Applicants' claims, are not disclosed or made obvious by the cited prior art, reconsideration and withdrawal of this rejection are respectfully requested.

Claim 4

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kamiya '035 in view of Roba et al. (U.S. 2004/0112092) (hereinafter Roba '092). This rejection is respectfully traversed.

As previously discussed, Kamiya '035 fails to explicitly or impliedly disclose a burner comprising a multi-tube assembly **consisting of** (emphasis added) three tubes: a center tube for feeding a silica-forming compound, a first outer tube for feeding oxygen gas and a second outer tube for feeding hydrogen gas, wherein the multi-tube assembly is surrounded by a first tubular shell, a plurality of first nozzles, a second tubular shell and a plurality of second nozzles. Furthermore, as acknowledged by the Examiner, Kamiya '035 fails to teach or suggest a tubular

jacket disposed outside the main burner to surround at least an end portion thereof. Roba '092 fails to cure these deficiencies.

Roba '092 is directed to a deposition process for manufacturing an optical preform. Contrary to the instant invention, Roba '092 does not teach or suggest a burner comprising first and second nozzles for feeding a combustion supporting gas such as oxygen. If such nozzles are not provided, the combustion efficiency would not increase and the high-temperature region would not be uniformly distributed throughout the entire flame, thus resulting in ingots with non-uniform characteristics from the center to the periphery. In addition, it is respectfully submitted that one skilled in the art would not have been motivated to combine the teachings of Roba '092 with those of Kamiya '035 or to modify these teachings in an attempt to arrive at the novel burner of the instant invention.

Because the Examiner has failed to establish a *prima facie* case of obviousness, reconsideration and withdrawal of this rejection are respectfully requested.

CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and objections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Gerald M. Murphy, Reg. No.

28,977 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By #32,868

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